TRAVEL ANALYSIS REPORT

DOUGLAS RANGER DISTRICT
Laramie Peak Unit
Medicine Bow-Routt National Forests and Thunder Basin National Grassland
Albany, Converse, Natrona and Platte Counties, Wyoming

United States
Department of
Agriculture
Forest Service

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Abstract:
This Travel Analysis Report documents a route-by route analysis of all National Forest System roads and motorized trails on the Laramie Peak Unit of the Douglas Ranger District and recommends the minimum road system needed for public access and efficient forest management. This report also documents whether changes to motorized trail designations are recommended. The analysis area is the Laramie Peak Unit of the Douglas Ranger District, which includes portions of the Medicine Bow-Routt National Forests and Thunder Basin National Grassland, Wyoming.

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EXECUTIVE SUMMARY

This document is the Travel Analysis Report (TAR) for areas administered by the Douglas Ranger District on the Medicine Bow-Routt National Forests and Thunder Basin National Grassland. The Travel Analysis Report documents a route-by-route analysis of National Forest System roads and motorized trails on the Laramie Peak Unit of the Douglas District and recommends the minimum road system needed for public access and efficient forest management. This report also documents the analysis of whether changes to motorized trail designations are recommended.

The outcome of the TAR is a set of science-based recommendations for potential future changes to the forest transportation system to meet on-going management objectives. These recommendations are based on an analysis of the physical, biological, social, and economic risks and benefits of system roads and motorized trails.

Travel Analysis is intended to inform subsequent National Environmental Policy Act (NEPA) processes, allowing individual projects to be more site-specific and focused, while still addressing cumulative impacts. The Travel Analysis Process (TAP) neither produces decisions nor allocates National Forest System lands for specific purposes. It merely provides the analytical framework from which to make recommendations that may then be examined in the NEPA process. It describes current conditions, risks, benefits, opportunities (need for change), and priorities for actions. Future NEPA analyses that include public involvement may carry forward, reject or change the recommendations in the report, and provide the basis for making specific transportation system related decisions.

Summary of Issues

Issues were identified using previous public involvement and internal Forest Service input and are discussed in more detail in Step 3.

- Insufficient resources for maintenance of the existing system of roads and trails
- Access needs, including motorized recreation use, access and connectivity to a variety of recreational opportunities, access for forest management, and emergency access
- Environmental impacts, including current conditions and maintenance or repair costs, impacts to water resources, soil and geological hazards, fragmentation and wildlife security, impacts to vegetation (particularly invasive species), and impacts to cultural resources
- Social impacts, including impacts to recreationists wanting to recreate in areas not directly under the influence of motorized use as well as those who prefer motorized opportunities.

Analysis

A risk-benefit assessment was used to rank system roads and motorized trails on the Laramie Peak Unit based on *risks* (road/trail condition/maintenance and repair costs, impacts on water resources, soil/geologic hazards, wildlife habitat, invasive species, cultural resources, and social conflict potential) and *benefits* (motorized recreation use, recreation access/connectivity, forest management, and emergency access). The categories chosen to rank risks and benefits were based on issues identified in Step 3 and by criteria set by the Interdisciplinary Team (IDT) in Step 5.

Key Results and Findings

Through the Travel Analysis Process, the IDT ranked routes based on their *risks* to natural, social, economic and cultural resources and their *benefits* to recreation use, forest management access, and emergency access. Each road was then further evaluated to determine if it was needed as part of the minimum road system. Opportunities for changes to roads and motorized trails are:

- Approximately **125** miles of **roads** in the current system (56%) have high to medium benefits and should be regularly maintained to mitigate and prevent resource risk.
- Approximately **80** miles of **roads** in the current system (36%) have greater risk than benefit, and should be considered for decommissioning, closure, or mitigation to reduce resource risk. Approximately **70** miles of these roads (88%) are currently closed to public, motor vehicle travel.
- **No additional roads** are recommended to be closed or decommissioned in this analysis due to previously signed decision as identified in the 2007 Decision Notice and Finding of No Significant Impact for Laramie Peak Travel Management project. The District's decision was to convert certain motorized roads and trails to a less, resource impactive option. This includes converting some motorized roads to motorized trails, some motorized trails to non-motorized trails and closing some roads to public motorized travel. Reducing resource impacts from motorized travel was accomplished by closing approximately 89 miles of motorized roads to public travel. These are identified as operational maintenance level 1 roads in the Laramie Peak TAP matrix.
- All **49** miles of **motorized trails** in the current system, having either a medium or high benefit and should be regularly maintained to mitigate and prevent resource risk.

The figures above are not additive, meaning a road can be in multiple categories as identified above. For example, a road can have a medium benefit (first bullet) and a high risk (second bullet).

How the Report will be Used

This report will assist in addressing issues related to the road and motorized trail systems. It will be used to inform future site-specific analyses, decisions, and specific actions. Travel analysis is an ongoing process and it is anticipated that this document will be referenced for and updated by future analyses.

INTRODUCTION

Travel Management Rule

In 2005, the US Forest Service adopted the Travel Management Rule. The rule changes the way the Forest Service regulates motor vehicles on National Forests and Grasslands. The Travel Management Rule requires that National Forests identify their minimum road system and designate roads, trails and areas for motor vehicle use. This means that after the designation process is complete, which includes an opportunity for public comment, Forest visitors will be able to operate motor vehicles only on the roads, trails, and areas that have been designated. The designations will not only list what roads, trails, and areas can be used, but also what types of vehicles can be used, and what time of year they can be used.

There are some exceptions to these designations, which include persons with a Forest Service permit authorizing the otherwise prohibited act, any Federal, State or local law enforcement officer, or member of an organized rescue or firefighting force engaged in the performance of an official duty, and Forest Service administrative use.

The objective of the Travel Management Rule is not to limit access to the Forest, but to protect the Forest from unmanaged use. The Forest Service must strike a balance in managing all types of activities. To this end, a designated system of roads, trails, and areas for motor vehicle use, established with public involvement, enhances public enjoyment of the National Forests while maintaining other important values and uses on National Forest System lands. The Travel Management Rule works to manage current use so future generations can continue to enjoy access to our National Forest System lands.

The travel management regulations (36 CFR 212.5(b)) require the Forest Service to "identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands"; and to identify roads "no longer needed to meet forest resource management objectives and that, therefore, should be decommissioned or considered for other uses, such as for trails".

Travel Analysis Process

This Travel Analysis Process (TAP) is a broad, comprehensive look at the transportation network. The main objectives are:

- Balance the need for access while minimizing risks by examining important resource, social, and economic issues related to roads and motorized trails;
- Furnish maps, tables, and narratives that display transportation management opportunities and strategies that address future access needs and environmental concerns;
- Identify the need for change by comparing the current road and motorized trail system to the desired condition; and
- Make recommendations to inform decisions in subsequent NEPA documents.

This is an iterative, not a one-time, process. When conditions change, additional analysis may point to the need for revisions. In fact, a travel management route designation process will likely result in additional information and, perhaps, decisions that will then be reflected in changes to the recommendations in this report.

Before the Forest Service adopted the Travel Management Rule, the Roads Analysis Process described in Forest Service Manual 7712.1 and publication FS-643, *Roads Analysis; Informing Decisions about Managing the Transportation System* was used. A Roads Analysis Report (RAP) analyzing maintenance level 3, 4, and 5 roads across the Medicine Bow National Forest was completed in March 2002. The 2002 RAP analyzed four geographical areas including Laramie Peak. The RAP did not recommend removal of any maintenance level 3, 4 or 5 roads from the Laramie Peak area. In 2007, a Decision Notice was issued for the Laramie Peak Travel

Management project. The 2007 Decision, along with other project specific decisions, resulted in the existing condition for Laramie Peak.

This 2015 Travel Analysis Report revises and updates the Medicine Bow National Forest Roads Analysis Report for all roads managed by the Douglas Ranger District. The Travel Analysis Process consisted of six steps:

1. Analysis Design
2. Background
3. Issues
4. Benefits and Risks
5. Opportunities and Priorities
6. Minimum Road System

The Report is NOT a decision. Travel *Analysis* provides only an analytical framework from which to make recommendations. NEPA includes formal public involvement which enables agencies to make decisions.

Forest Plan Direction

The 2003 Medicine Bow National Forest Revised Land and Resource Management Plan, herein after referred to as Forest Plan, establishes programmatic direction for the management of National Forest System lands. The Medicine Bow Forest Plan identifies specific management areas (MAs), which provide management direction by, emphasizing a particular resource and identifying associated guidelines (prescriptions) for management activities. Douglas District includes 15 different MAs, encompassing everything from Backcountry, Non-motorized areas (MA 1.31) to Administrative Sites (MA 8.6). See Table 1 below for a list of MAs. Applicable Forest-wide transportation General Direction statements, as well as transportation direction for MAs can be found in Appendix A. Note, however, (Table 1), not all MAs have specific transportation direction.

The analysis and recommendations in this report are all consistent with Forest Plan direction.

Table 1: Laramie Peak Unit Management Areas[1]

MA	Resource Emphasis
1.31	Backcountry Recreation, Year-round Non-motorized
1.33	Backcountry Recreation, Summer Non-motorized with Winter Snowmobiling
2.1	Special Interest Area
2.2	Research Natural Area
3.31	Backcountry Recreation, Year-round Motorized
3.5	Forested Flora or Fauna Habitat, Limited Snowmobiling
3.58	Crucial Deer and Elk Winter Range
4.3	Dispersed Recreation
5.12	General Forest and Rangelands, Range Vegetation Emphasis
5.41	Deer and Elk Winter Range
5.42	Bighorn Sheep Habitat
7.1*	Residential/Forest Interface
8.21	Developed Recreation
8.3	Utility Corridors, Electronic Site
8.6	Administrative Site

[1] *Lacks transportation related direction

STEP 1: ANALYSIS DESIGN

Analysis Area

The analysis area for this project is the Laramie Peak Unit of the Douglas Ranger District, which is approximately 352,235 acres in size. About 163,464 acres (46%) are National Forest System lands. The remaining 188,771 acres are private and State lands (54%) within the boundaries of the National Forest. Although road and trail recommendations are limited to routes under Forest Service jurisdiction on the Laramie Peak Unit, the IDT considered roads, resources, and recreational opportunities on adjacent lands and under other jurisdictions in this analysis.

Interdisciplinary Team

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Analysis Plan

To complete the analysis, the IDT:

- Reviewed and assembled existing data.
- Verified accuracy of system road and motorized trail locations on maps.
- Identified discrepancies between on-the-ground conditions and the Forests' INFRA and GIS databases. Documented and corrected where possible these data discrepancies.
- Where possible, verified the current conditions of roads and motorized trails, including safety issues, surface type and environmental impacts.
- Identified preliminary access and resource issues, concerns, and opportunities through previous public involvement and internal resource staffs.
- Performed the analysis concurrently with other plans and projects ongoing on the District.
- Recommended changes to the road and motorized trail systems based on the findings of the analysis to identify the minimum road system and improve the management of forest resources.

Information Considered by the IDT

- Actual location and condition of system roads and motorized trails. A complete inventory of **non**-system routes was not conducted.
- Maintenance responsibility.
- Assessment of previous and current opportunities, problems and risks for all roads and motorized trails.
- Soil, hydrology, vegetation, invasive species, wildlife, and cultural resources where they are impacted by roads and/or motorized trails.
- Areas of special sensitivity, resource values, or both.
- Public access and recreational needs and desires in the areas, including access for nearby landowners.
- Conflicts among users, public access, user safety, and accessibility.
- Anticipated future levels of motor vehicle use and changes in motor vehicle technology.

- Transportation needed for Forest management activities.
- Transportation investments to meet land management plan objectives.
- Current road and motorized trail uses.
- Economic costs and benefits.
- Road and motorized trail management objectives.
- Best management practices.
- Forest Plan and other management direction.
- Agency objectives and priorities.
- Interrelationship with other governmental jurisdictions.
- Applicable federal, state, and local laws.
- Public user group values and concerns.
- Forest-wide and project level road and motorized trail analyses.
- Previous District decisions regarding travel management.

STEP 2: BACKGROUND

Road Management

The transportation system on the Medicine Bow National Forest serves a variety of resource management and access needs. Most roads on the Laramie Peak Unit were constructed for grazing and public visitor access. Others resulted from providing access to private lands, water storage, and transmission projects for adjoining private landowners. Some were created specifically to provide access for a wide variety of recreation activities on Laramie Peak.

National Forest System Roads (NFSR, or Forest Roads) are managed in accordance with Road Management Objectives (RMO) for each road. RMOs stipulate the uses for which a road was originally designed and is currently managed, as well as maintenance intensity and frequency, and anticipated future use. All Forest Roads are also assigned a specific maintenance level. Roads may be maintained at one level now but at a different level in the future. The assigned maintenance level considers current needs, road condition, budget constraints, and environmental concerns. The desired objective maintenance level may be the same as, higher, or lower than, the operational maintenance level. On the Laramie Peak Unit, the operational maintenance level is usually the same as its objective.

Discussions about roads in this Report use standard Forest Service maintenance level (ML) terminology: ML 1 (closed roads); ML 2 (suitable for high clearance vehicles); ML 3 (suitable for passenger cars); ML 4 (suitable for passenger car at moderate speeds); and ML 5 (paved, or chip sealed). Locally, ML 1 and 2 roads are usually native surface, and ML 3 and 4 roads usually have gravel.

Trail Management

Many of the District's trails evolved through repeated use by grazing permittees and other forest users and visitors; some were designed and constructed by Forest Service employees or contractors. The majority of motorized trails on the Laramie Peak Unit were "grandfathered" by virtue of historic motorized use at a time when such use was not regulated, but some were developed specifically to provide a motorized trail experience.

Like roads, National Forest System Trails (NFST) are managed in accordance with Trail Management Objectives (TMOs) established for each trail. Trail classes range from 1, the most undeveloped, to 5, highly developed. Design

parameters and maintenance frequencies are based on the trail class and level of development. Routine maintenance typically includes route marking, removal of fallen trees, brushing, and drainage.

In general, summer trails are designed and managed for hiker/pedestrians, pack and saddle stock, bicycles, motorcycles, and/or all-terrain vehicle (ATVs). The design of any specific trail is based on the most intensive use. For example, ATV trails are the most intensive, followed by stock-use trails, while hiker/pedestrian trail are the least intensive in design. In many cases, trails are managed for multiple uses (e.g. an ATV trail that is open and managed for all other uses).

It should be noted that following the implementation of the Travel Management Rule, trail terminology relating to accepted and prohibited uses was refined and differs slightly from the terminology used in the original Trail Management Objectives. On the Laramie Peak Unit, ORV trails are open to vehicles 50" or less and motorcycles. Motorized trails do not allow use by full-size, 'street-legal' cars and trucks, such as jeeps and pickups, regardless of their width. Those vehicles may only be used on roads designed and designated as Maintenance Level 2 or higher (open). In all cases, travel is restricted to the designated road and/or trails; cross-country travel is prohibited.

Geographic Information System and Corporate Database

The agency's GIS and corporate database ("INFRA") catalogs information about each road and trail. INFRA, specifically, includes information such as the road or trail number, length, beginning and ending locations, ownership, surface type, etc. The database also lists road features, such as culverts, switchbacks, signs, waterbars, cattle guards, and gates, along with maintenance records.

As part of this 2015 TAP/TAR, the District has tried to ensure that the GIS and INFRA databases match what is actually on the ground. All motorized system trails on the District have been field-verified. However, not all Level 1 and non-system roads have been field-verified, and in some places, features that are not roads are still incorrectly identified as such. Some of these are fence lines, ditches, or other non-roads that looked like roads on the old aerial photos; others are unauthorized or user-created routes that were never intended to be included in the system. There are probably many more unauthorized routes that are not even mapped. As problems or mistakes are discovered, corrections to the databases will continue.

Since 2000, trail inventories and condition surveys have been done for most of the District's trails. As a result, most alignments have been corrected using GPS data, and features documented in INFRA.

Existing Direction

Travel analysis focuses on identifying needed changes to the forest transportation system. In general terms, the existing direction describes how National Forest roads and trails are currently managed for motor vehicle use. Seasonal and other restrictions, prohibitions, and closures are part of the existing direction, which is displayed on the Laramie Peak Unit Motor Vehicle Use Map (MVUM). MVUMs are available for free from local Forest Service offices and at http://www.fs.usda.gov/main/mbr/maps-pubs.

State, counties, other Federal agencies, and private entities sometimes control roads that cross National Forest lands through easements from the Forest Service. Easements issued to other entities are generally not managed as National Forest System Roads.

Road and trail mileages on the Laramie Peak Unit are displayed in Table 2. Of the nearly 222 miles of roads on the Unit, approximately 17 miles are closed during the winter and spring to protect road surfaces and other resources. Of the nearly 49 miles of trails on the Unit, approximately 27 miles are closed during the winter and spring to protect trail surfaces and other resources. Mileages in Table 2 have been rounded to the nearest whole mile.

Table 2: Existing System Roads and Motorized Trails

Roads	Miles
Maintenance Level 5	0
Maintenance Level 4	0
Maintenance Level 3	32
Maintenance Level 2	101
Maintenance Level 1	89
Total System Roads	222
Motorized Trails	
Open to All Vehicles	12
Open to Motorcycles only	0
Open to Vehicles 50" or less in Width	49
Total Motorized Trail	49

STEP 3: KEY ISSUES

Issues were generated from public responses to past NEPA specific project proposals and discussions with other public agencies, land owners and special use permittees. Key issues identified by Forest Service personnel and previous public comments are, in no particular order:

Insufficient Resources for Maintaining Existing Roads and Motorized Trails

Inadequate maintenance reduces access for National Forest users and management, accelerates soil erosion (ruts don't allow water to run off), and degrades water quality and aquatic habitat by increasing sediment. Current funding for road and trail maintenance is inadequate to maintain the existing system and is not expected to improve.

Access

Motorized vehicle access, of many types, is needed to provide recreational opportunities, efficiently manage the Forest, and provide access for emergency response.

- Motorized Recreation: Roads and motorized trails are used by Forest visitors for sightseeing, 4-wheel driving, ATV, UTV, and motorcycle riding. Recent travel management analyses, formal and informal public input, and anecdotal evidence suggest that opportunities for motorized recreation on trails are not fully meeting user demand. A lack of loops and single-track trails are the primary concerns cited by users.
- Recreation Access/Connectivity: Roads and motorized trails also provide access to numerous other recreational activities such as hiking, camping, hunting, firewood gathering, rock collecting, and connection to other roads and trails.
- Forest Management: Roads, and to a lesser extent motorized trails, provide access for fuels management, grazing, noxious weed treatment, etc.
- Easements and Authorizations: Roads provide legal access to inholdings and facilities managed under easements, rights of way, and other special use authorizations.
- Emergency Access: Roads, and some motorized trails, provide emergency access during fire suppression, search and rescue, and medical response.

Environmental Impacts

- Impacts to water resources: Erosion and sediment from roads and motorized trails in areas with perennial, intermittent, and ephemeral stream channels or wetlands can impair the ecological and hydrologic function of drainage channels;
- Soil and Geologic Hazards: Much of the analysis area has highly erosive soils that are extremely susceptible to compaction, rutting, gullying, and development of mud holes. Some soils are also susceptible to mass movement, such as landslides.
- Fragmentation and wildlife security: Motorized routes fragment wildlife habitat, create barriers to movement, reduce habitat capability to sustain populations, and increase disturbance to animals.
- Impacts to vegetation: Motor vehicle use may cause the spread of invasive species by dispersing seed sources.
- Impacts to cultural resources: Motorized use can impact cultural resources.

STEP 4: BENEFITS AND RISKS

The risk and benefit criteria identified in Table 3, below, were developed by considering;

- Key issues from Step 3 above,
- Information in previous roads analysis reports, including the 2002 Medicine Bow National Forest Roads Analysis Report, the 2007 Laramie Peak Travel Management project, and
- Additional knowledge and information from District staff.

Criteria and Rankings Used in the Risk and Benefit Analysis

As mentioned before, roads and motorized trails provide access for many users. However, they can also have negative effects on natural and cultural resources, and often exceed maintenance and repair allocations. The IDT identified the following risks and benefits as the most important resource issues for our transportation system.

Table 3: Road and Motorized Trail Risks and Benefits

Risks	Benefits
• Condition/Maintenance and Repair Costs • (Lack of or inadequate) Aquatic Organism Passage • Water Quality • Soil/Geologic Hazards • Wildlife • Invasive Species • Cultural Resources • Social Conflicts (trails only)	• Motorized Recreation Use • Recreation Access/Connectivity • Forest Management Access (Range, Timber and Special Uses) • Emergency Access

As shown in Appendices E & F, each member of the IDT evaluated each road and motorized trail for each of these risks and benefits, assigning a numerical value (1 for Low, 2 for Medium, and 3 for High). This was based on data in GIS layers, maintenance and repair cost data in INFRA, and professional knowledge of the routes, their resource impacts and benefits for various uses. Assignment of the High, Medium, or Low rating for each category generally followed the following guidelines.

Table 4: Road and Motorized Trail Risk and Benefit Guidelines

ISSUE	RATING	CRITERIA GUIDELINES
RISKS		
Condition/Maintenance and Repair Costs	High	High level of maintenance and repair based on the presence of 3 or more of the following: washboarding; surface deterioration; landslides; slumping; slope raveling; drainage problems; rutting or gullying; mud holes; poor condition of drainage structures or culverts; and design deficiencies.
	Medium	Moderate level of maintenance and repair based on the presence of 2 or more of the above conditions.
	Low	Little or no maintenance and repair needed; no existing damage or just 1 of the above conditions present. Condition fair or better.
Water Resources	High	Greater than 25% of road/trail within 300' of streams and water bodies, or 100' of wetlands, or connected to them. Or roads in watersheds with road densities > 2.4 miles per square mile, or watersheds where road maintenance BMPs are applied to less than half the roads.
	Medium	10-25% of road/trail within 300' of streams and water bodies, or 100' of wetlands, or connected to them. Or roads in watersheds with road densities 1.0 - 2.4 miles per square mile, or watersheds where BMPs applied to 50%-75% of roads.
	Low	<10% of road/trail within 300' of streams and water bodies, or 100' of wetlands, or connected to them. Or roads in watersheds with road densities <1.0 mile per square mile, or watersheds where BMPs applied to > 75% of roads.
Soil/Geologic Hazards	High	Road/trail damage from landslides, slumps, mudflows, rock fall, retaining wall failure, gullying, or soils that are unstable or extremely susceptible to erosion.
	Medium	Minor road/trail damage from soil or geologic hazards.
	Low	No known damage from soil or geologic hazards.
Wildlife	High	High level of motorized and non-motorized use on roads/trails in highly roaded area.
	Medium	Moderate level of use on roads/trails in moderately roaded area.
	Low	Low level of motorized and non-motorized use on roads/trails in minimally roaded area.
Invasive Species	High	Numerous populations of noxious weeds in vicinity of route.
	Medium	Some known populations of noxious weeds in vicinity of route.
	Low	No or few populations of noxious weeds near route.
Aquatic Organism Passage (AOP)	High	Roads have 2 or more stream crossings that impede any life stage aquatic organism passage at any flow level.
	Medium	Roads that have 1 stream crossing that impede any life stage aquatic organism passage at any flow level.
	Low	Roads that do not impede AOP.

ISSUE	RATING	CRITERIA GUIDELINES
RISKS, continued		
Cultural Resources	High	Sites eligible to the National Register of Historic Places (NRHP) or sites that have not yet been evaluated for nomination to the NRHP within a 300' corridor along roads/trails. Areas within 300' of roads/trails that have "high" predictive level (rating 7 - 9) for presence of prehistoric cultural resources; AND little or no archaeological survey (NOTE: to be adequately surveyed, 75%+ of the 300' corridor must have been inventoried and the project initiated within the last 15 years.)
	Medium	Areas within 300' foot corridor along roads/trails that have "medium" predictive level (4 - 6) for presence of prehistoric cultural resources; AND have little or no archaeological survey (to be considered adequately surveyed, AND 75% or more of the 300' corridor has been inventoried and the project initiated within the last 15 years)
	Low	Areas within 300' corridor along roads/trails with "low" predictive level (0-3) for presence of prehistoric cultural resources, OR archaeological inventory completed within 300' corridor with no or only ineligible cultural resources identified. To be considered adequately surveyed, 75%+ of the 300' corridor must have been inventoried and the project initiated within the last 15 years.
Social Conflict Potential (Trails only)	High	Heavy amount of non-motorized trail use or known user group conflicts
	Medium	Moderate amount of non-motorized trail use or user group conflicts
	Low	Low amount of non-motorized trail use or known user group conflicts

ISSUE	RATING	CRITERIA GUIDELINES
BENEFITS		
Motorized Recreation Use	High	Roads/trails frequently used for motorized recreation activities (includes sightseeing, 4X4, ATV, motorcycle).
	Medium	Roads/trails occasionally used for motorized recreation activities.
	Low	Roads/trails rarely or never used for motorized recreation activities, mostly ML1/closed roads.
Recreation Access/Connectivity	High	Roads/trails that provide access to numerous or high value recreation opportunities, or connectivity to many other motorized routes.
	Medium	Roads/trails that provide access to some recreation opportunities or connectivity to some other motorized routes.
	Low	Roads/trails that provide access to limited recreation opportunities or do not connect to other motorized routes.
Forest Management Access- Timber	High	All roads within primary timber management areas OR major road arteries through non- timber harvest areas for access to primary timber areas. Roads through non-primary timber areas that are not precluded from treatment.
	Medium	All roads not designated as "High" or "Low" in non-primary timber areas.
	Low	Roads closed to other major roads, spurs <0.25 miles, or roads that do not provide additional access to timber management areas.

ISSUE	RATING	CRITERIA GUIDELINES
BENEFITS, continued		
Forest Management Access- Range	High	Roads used frequently by USFS personnel for grazing permit administration. Roads used annually to access fences, water developments, salting areas, and/or sheep camp sites.
	Medium	Roads used occasionally by USFS personnel for grazing permit administration or that need occasional maintenance (water developments, fences, etc.).
	Low	Roads rarely used for permit administration or with few to no structures in the allotment.
Forest Management Access – Easements and Authorizations	Low	Roads provide general forest access but are not included in or encumbered by any right of way, easement or other special use authorization.
	High	Roads provide access for permitted uses or private land ingress/egress. Roads are included in or encumbered by one or more rights of way, easements or other special use authorizations.
Emergency Access and emergency egress	High	Roads/trails used frequently or likely needed for emergencies such as fire suppression, search and rescue, etc.
	Medium	Roads/trails infrequently used or needed for emergencies.
	Low	Roads/trails that are rarely used and will likely not needed for emergency access.

Once a numerical value was assigned to each category, the average overall risk or benefit rating was calculated. Those rankings with a value of $\geq$2.5 are assessed as "High", those between 2.5 and 1.5 are assessed as "Medium", and those rankings < 1.5 are considered to have a "Low" risk or benefit.

The first step for making a recommendation on whether to keep ("Y") a road or not ("N") was also based on a mathematical formula. If the road "Benefit – Risk" score was greater than -0.70, then the road received a "Y" to keep. If the score was -0.70 or less, the road received an "N", recommended to not keep. The second step included review of all road and trail segments by the IDT to determine if the recommendation was reasonable, based on field and professional knowledge. Thus, not all recommendations are based solely on results of the mathematical formula.

For additional information on the rationale and methodology employed by specialists in the evaluation process, see Appendix C.

Results

The analysis resulted in 9 possible risk/benefit pairs:

High Risk/High Benefit;
High Risk/Medium Benefit; High Risk/Low Benefit;
Medium Risk/High Benefit; Medium Risk/Medium Benefit; Medium Risk/Low Benefit;
Low Risk/High Benefit;
Low Risk/Medium Benefit; and Low Risk/Low Benefit.

Table 5: Road Miles in Each R/B Category

Risk/Benefit Ratio	# miles	%
ML5 Roads – None in Analysis Area		
ML4 Roads – None in Analysis Area		
ML3 Roads		
High Risk/High Benefit	6.4	20%
Medium Risk/High Benefit	23.19	72%
Medium Risk/Medium Benefit	2.68	8%
Total	32.27	100%
ML2 Roads		
High Risk/Medium Benefit	3.21	3%
Medium Risk/High Benefit	26.6	26%
Medium Risk/Medium Benefit	61.99	62%
Medium Risk/Low Benefit	7.0	7%
Low Risk/Medium Benefit	0.5	0.5%
Low Risk/Low Benefit	1.5	1.5%
Total	100.8	100%
ML1 Roads		
Medium Risk/High Benefit	0.0	0%
Medium Risk/Medium Benefit	0.0	0%
Medium Risk/Low Benefit	69.19	78%
Low Risk/Medium Benefit	0.0	0%
Low Risk/Low Benefit	19.4	22%
Total	88.59	100%

Table 6: Trail Miles in Each R/B Category

Risk/Benefit Ratio	# miles	%
Motorized Trails		
Medium Risk/High Benefit	8.44	17%
Medium Risk/Medium Benefit	40.63	83%
Total	49.07	100%

STEP 5: OPPORTUNITIES AND PRIORITIES

Maintenance Options

Maintain As Is

Retain in current condition or, through more frequent maintenance, slightly improve road surface, drainage, and clearing widths.

Better Maintenance and/or Storm-proofing

Maintain the road but minimize long-term costs and the potential for resource damage through installation of drainage dips and similar features. Usually, the benefits of expending some funds now significantly exceed costs of future, and often more expensive, repairs.

Convert to Another Use

Convert some roads to another use, such as a motorized or non-motorized trail. While this eliminates the need to maintain a road, it shifts the burden (usually a smaller one) to another program area, such as trails.

Close to Motorized Use

Close roads with little to no immediate benefit but retain on the system for future forest management. This eliminates short-term costs, although there may be initial costs to ensure a road is "self-maintaining" for the next 10-30 years.

Decommission
Decommission roads that are no longer needed, removing them from the system (i.e., taking away the number). This eliminates all future maintenance costs; there may be one-time costs to decommission.

Road Recommendations
The general recommendations for each of the 9 risk/benefit categories are described below. They do not necessarily apply to all roads within each category; Appendix E lists our recommendation for each road.

High Risk/High Benefit
High Risk/High Benefit roads typically receive the highest priority for maintenance and mitigation. They should probably be retained with mitigation of resource impacts as soon as possible. There is approximately 6.5 miles of roads on the Laramie Peak Unit within this category.

High Risk/Medium Benefit
High Risk/Medium Benefit roads should either be closed or given a higher priority for maintenance to mitigate resource impacts. Several of the roads in this category, approximately 3 miles, are very beneficial to recreation, range and emergency access needs.

High Risk/Low Benefit
There are no roads on the Laramie Peak Unit that fall into this category.

Medium Risk/High Benefit
Medium Risk/High Benefit roads should also be given a high priority for maintenance to reduce the risk. Approximately 50 miles of road are in this category across nearly all Operational Maintenance Levels (ML3 and ML2). While these roads negatively affect some resources, they also provide a high level of public and/or management benefit. All roads in this category are recommended to be retained.

Medium Risk/Medium Benefit
Medium Risk/Medium Benefit roads should probably receive mitigation and maintenance, though secondary in priority to roads with higher benefits or higher risks. There are approximately 65 miles of road in this group, again across nearly all Operational Maintenance Levels. These roads create some resource impacts but also provide benefits. Typically, they are important for public access and resource management.

Medium Risk/Low Benefit
Medium Risk/Low Benefit roads were recommended for closure, decommissioning, or mitigation and maintenance. Approximately 76 miles fall into this category, with the majority (91%) being ML1 roads. Approximately 69 miles of roads in this category are not open to public motor vehicle travel. These roads are occasionally used through special use permit and emergency travel.

Low Risk/High Benefit
There are no roads on the Laramie Peak Unit that fall into this category.

Low Risk/Medium Benefit
Low Risk/Medium Benefit roads should be retained in light of their importance and relatively low resource risk. There approximately 0.5 miles of road on the Laramie Peak Unit in this category.

Low Risk/Low Benefit
Low Risk/Low Benefit roads need to be further evaluated for maintenance, closure, or decommissioning. Since the risks are low, they are not a priority. There are approximately 21 miles of these roads on the District; 19 miles in this category are not open to public motor vehicle travel. These roads are occasionally used through special use permit and emergency travel.

Motorized Trail Recommendations

Appendix F lists each motorized trail, its risk and benefit rankings, and recommendations. Suggested actions fell into two risk/benefit categories, in which all 49 miles are currently recommended to be retained.

This analysis was confined to the existing motorized trail system and did not include opportunities for system expansion through new construction, adoption of non-system routes, or re-designation of non-motorized trails. Such additions to the system could certainly be included in future analyses.

Medium Risk/High Benefit

Trails in the Medium Risk/High Benefit category should be given high priority for mitigation of resource impacts. Eight miles fall into this category.

Medium Risk/Medium Benefit

Medium Risk/Medium Benefit trails also deserve mitigation and maintenance. The majority of motorized trails on the Laramie Peak Unit, 41miles, are in this category.

Step 6: Laramie Peak Unit Recommended Minimum Road System

A minimum road system is that which is needed for safe, efficient travel and for administration, use, and protection of National Forest System lands (36 CFR 212.5(b)(1)). Accordingly, that system must meet the Forest Service mission by providing basic access for forest management, recreation, and use of forest resources. Closed roads that are wanted for future forest management or current access by Special Use permittees are included.

Funding of routine maintenance on many Forest roads has been insufficient for a long time; deferred maintenance backlogs are even greater. Due to widely varying conditions of use, terrain, soil type, and weather, there is no precise amount of road and trail maintenance that can be reasonably predicted far into the future. At the least, roads open to passenger cars are subject to Highway Safety Act requirements and must be maintained to prevent significant resource damage. Beyond those requirements, however, there is great discretion in how roads are managed and, therefore, considerable variance in how many miles can be sustained within a given budget. Nonetheless, it appears likely that future allocations will make it difficult to keep the existing system at a modestly acceptable level. Reducing the overall size of the road system will allow better maintenance of what is left.

It is also important to note that the road system determined to be the minimum is not static. The suggested minimum road system developed in this process represents our best estimate at this time. It is impossible to predict what routes might be needed "down the road." We expect our minimum road system will continue to be updated, adjusted, and revised as conditions warrant. Future NEPA analyses will certainly consider the recommendations in this report and implement or revise them based on more site specific information.

Process

In addition to the Risk/Benefit Matrix, the IDT considered the following in identifying the minimum road system:

- Are there any non-system routes that should be part of the road system?
- Are there duplicate Forest roads that lead to the same area? If so, should one of those be closed, eliminated, or converted to a different use?
- How are the mix of risks and benefits related? Realizing that not all hazards and beneficial outcomes are equal, how can past experiences with maintenance of a particular road be used to predict future success?

Future Actions

The recommendations that resulted from this final integration of all considerations are in Appendix E, "Comments." These include changes to roads that are open to public motorized use, as well as to roads that are currently closed.

Mileages for the proposed minimum road system compared to the existing condition are shown in Table 7; a map of the recommended road system is Appendix D. Although the recommended road system does not greatly reduce total miles, it does create a more efficient road network that better reflects our resource and management objectives while minimizing adverse environmental impacts. Maintenance costs are expected to decrease slightly.

Table 7: Mileages of Recommended Minimum Road System Compared to Existing Road System

Maint. Level	Current	Min. Road	Difference
5	0	0	0
4	0	0	0
3	32.27	32.27	0
2	100.80	100.80	0
1	88.77	88.77	0
Total	**221.84**	**221.84**	**0**

Table 8: Recommended Changes to Motorized Trail System (miles)

Trail Use	Current	Retained	Roads Converted To Trails	Total	Difference
Open to All Vehicles	49	49	0	49	0
Single-track Motorized	0	0	0	0	0
Total	49	49	0	49	0

Creating a road network to match fluctuating annual appropriations only by closing and decommissioning roads and trails will probably not result in a comprehensive transportation system that meets the needs of the public and agency. The District will continue to pursue opportunities to transfer jurisdiction and maintenance responsibilities of some roads to the State or County. We will also seek improved, sustainable designs, use seasonal closures, apply for grants, recruit volunteers, and employ youth conservation corps trail crews to aid maintenance efforts.

While none of these approaches resolves every concern, taken as a whole, we believe the recommendations, maintenance priorities, and strategies in this Report will result in a better, more cost-effective system.

Report Approval

Prepared by:	/s/ *Travis Rixford*, Forestry Technician	May 13, 2015
Reviewed by:	/s/ *Misty Hays*, Deputy District Ranger	June 4, 2015
Recommended by:	/s/ *Shane Walker*, District Ranger	June 12, 2015
Approved by:	/s/ Dennis L. Jaeger , Forest Supervisor	July 9, 2015

APPENDIX A: FOREST PLAN DIRECTION

FOR MANAGEMENT AREAS WITHIN THE DOUGLAS RANGER DISTRICT

Forest-wide Direction

Goal 4 – Effective Public Service

Subgoal 4.a: Improve the safety and economy of Forest Service roads, trails, facilities, and operations, and provide greater security for the public and employees.

Objectives

- Within 15 years, maintain all roads classified for passenger vehicles to national standards.
- Within 15 years, maintain roads classified for high-clearance vehicle use and closed roads to national standards.
- Within 10 years, implement Phase II of the October 16, 2000 Forest Supervisor Forest-wide Travel Management Decision which is to complete site-specific travel management analysis to decide the future status of the Forest Transportation System.
- Within 10 years, decommission at least 150 miles of designated roads that will be determined through project level analyses and approval.
- By the end of the planning period, correct critical health and safety maintenance needs on roads identified as the potential minimum road system.

Strategies

- During site level travel management analysis, identify the minimum road and trail system by considering aquatic and riparian areas and aquatic wildlife, terrestrial wildlife and the need for security areas, ecosystem processes and functions including soil protection, economics such as expected maintenance budgets, commodity production, minerals management, range management, water production, special products, special use permits, general public transportation, administrative uses, fuels management, air quality, recreation, passive use values, and social issues.
- Monitor for and obliterate user-created motorized roads and motorized trails.
- Establish agreements with counties or local governments for cooperative road maintenance.

Management Area Prescriptions: Standards and Guidelines

MA 1.31, Backcountry Recreation, Year-round Nonmotorized

Standard — Prohibit motorized use.

Guidelines — After appropriate analysis and as funding allows, take the following actions, where needed:

a. Minimize trail impacts to scenic resources,

b. Eliminate duplicate routes,

c. Remove trails from maps where repeated travel over the same route is to be discouraged.

Provide only the minimum signing necessary to indicate directional information at trail junctions or to protect resources.

Existing unneeded roads should be decommissioned or converted to trails.

MA 1.33, Backcountry Recreation, Summer Nonmotorized with Winter Snowmobiling

Standard — Decommission and re-vegetate identified unneeded travelways.

Prohibit ORV and other motorized non-winter uses.

Guidelines — After appropriate analysis and as funding allows, take the following actions, where needed:

a. Minimize trail impacts to scenic resources,

b. Eliminate duplicate routes,

c. Remove trails from maps where repeated travel over the same route is to be discouraged.

Provide only the minimum signing necessary to indicate directional information at trail junctions or to protect resources.

Existing unneeded roads should be decommissioned or converted to trails.

MA 2.1, Special Interest Areas

Guideline — Construct new roads only when consistent with SIA values, such as interpretation or education.

MA 2.2, Research Natural Areas

Standards — Limit all motorized use, including snowmobiles, to administrative, LE, search and rescue, emergency, and scientific purposes.

Prohibit the construction of new trails, except where construction of new trails is necessary to correct resource damage from existing trails.

Guideline — Close or decommission existing roads, except where they provide necessary access for scientific or educational pruposes.

MA 3.31, Backcountry Recreation, Year-round Recreation

Guideline — After appropriate analysis, and if funding allows, take the following actions, where needed:

a. Minimize trail impacts to scenic resources;

b. Eliminate duplicate routes;

c. Remove trails from maps where repeated travel over the same route is to be discouraged.

MA 3.5, Forested Flora or Fauna Habitats, Limited Snowmobiling

Standard — Limit snowmobiling to designated over-the-snow routes.

Guideline — Manage for an ROS class of Roaded Natural, Semi-Primitive Motorized or Semi-Primitive Nonmotorized as mapped.

MA 3.58, Crucial Deer and Elk Winter Range

Standard — Restrict motorized use to designated routes as identified in Geographic Area direction from November 15 – April 30.

Guideline — Close roads, as needed, to prevent disturbance during the winter and during fawning/calving periods.

Avoid constructing new roads through important forage, cover, and fawning/calving areas.

MA 4.3, Dispersed Recreation

Guideline — Design roads and trails to blend with the landscape.

Manage for a summer ROS class of Rural, Roaded Natural, Semi-Primitive Motorized or Roaded Natural, as mapped.

Manage for a winter ROS class of Rural, Semi-Primitive Motorized, or Semi-Primitive Non-Motorized, as mapped.

MA 5.12, General Forest and Rangelands, Rangeland Vegetation Emphasis

Guidelines Manage for a year-round ROS class of Rural, Roaded Natural, Semi-Primitive Motorized or, Semi-Primitive Non-Motorized, as mapped.

MA 5.41, Deer and Elk Winter Range

Standard Restrict management and use activities during the winter and spring periods (November 15 – April 30) where conflicts with wintering wildlife are identified, except for habitat improvement.

MA 5.42, Bighorn Sheep Habitat

Standards Do not construct new travel routes across lambing grounds.

Restrict over-the-snow vehicles use to designated routes.

MA 7.1, Residential/Forest Interface

Standard None

Guidelines None

MA 8.21, Developed Recreation

Guidelines Manage for an ROS class of Roaded Natural or Rural in summer. Manage for an ROS class of Rural, Roaded Natural, Semi-Primitive Motorized, or Semi-Primitive Non-Motorized in winter, as mapped.

MA 8.3, Utility Corridors, Electronic Site

Guidelines Issue road permits to utility/electronic site permittees where necessary. Access roads may be closed to public use.
Manage for a year-round ROS class of Semi-Primitive Nonmotorized, Semi-Primitive Motorized, Roaded Natural, or Roaded Modified, as mapped.

MA 8.6, Administrative Sites

Guidelines Manage for a year-round ROS class of Semi-Primitive Motorized, Roaded Natural, Rural, or Roaded Modified.

Appendix B: Road and Trail Maintenance Costs

Maintenance is the act of keeping fixed assets (such as roads or trails) in acceptable condition. It includes preventive maintenance normal repairs, replacement of parts and structural components, and other activities needed to preserve a fixed asset so that it continues to provide acceptable service and achieves its expected life. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than those originally intended. (Financial Health – Common Definitions for Maintenance and Construction Terms, September 29, 1998)

Maintenance includes both annual maintenance and deferred maintenance. Annual maintenance is work performed to maintain serviceability, or repair failures during the year in which they occur. It included preventative and/or cyclic maintenance performed in the year in which it is scheduled to occur. Unscheduled or catastrophic failures of components or assets may need to be repaired as a part of annual maintenance. (Financial Health – Common Definitions for Maintenance and Construction Terms, September 29, 1998)

Deferred maintenance is maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was put off or delayed for a future period. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value. (Financial Health – Common Definitions for Maintenance and Construction Terms, September 29, 1998)

Road Maintenance Budget

The Medicine Bow-Routt National Forests and Thunder Basin National Grassland (MBRTB) appropriated budget allocation (CMRD) for road maintenance and management of roads was $1.27 million in fiscal year (FY) 2011, $964,000 in FY2012, and $1.55 million in FY2013. Of these amounts approximately 70% goes towards road maintenance activities Forest-wide. Based on the percentage of total MBRTB mileage approximately 35.9% (about $385,000) goes towards all road maintenance activities on the Laramie Peak Unit and Thunder Basin National Grassland of the Douglas Ranger District, including annual and deferred maintenance.

In prior years, appropriated road funding was supplemented by road construction and maintenance work performed by timber purchasers through the commercial timber sale program in the Laramie Peak Unit. This program has steadily declined over the past 20 years thus increasing demands on appropriated dollars for road maintenance. On the Douglas Ranger District the decline in timber purchaser maintenance has been somewhat offset by the increase in road use permits for oil and gas exploration and development on the Thunder Basin National Grassland.

Road Annual Maintenance

Annual road maintenance costs may be calculated by two methods, the INFRA database and estimated actual costs as determined by the MBRTB engineering staff. These estimated actual costs include Forest-wide costs associated with the force account road crew (salary, purchase of heavy equipment, FOR, fuel, maintenance, and overhead) and the costs related to county cooperative agreements (dust abatement, asphalt patching, and cost for counties to blade the roads). Annual maintenance work accomplished through contracts is not included in the estimated actual costs. FY2013 accomplishment miles were used for a baseline on how much work the crew could do annually. The costs were then divided by accomplished miles resulting in an average Forest-wide cost per mile by maintenance level for annual maintenance. The following is a description of the estimated actual annual road maintenance costs for each maintenance level as determined by the MBRTB engineering staff.

Maintenance Level 1 Roads:

ML1 roads are closed to public motorized use. They are used infrequently for administrative purposes. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs. Emphasis is normally given to maintaining drainage facilities and runoff patterns. No maintenance other than a condition survey may be required so long as no potential exists for resource damage. Most of these roads are in a stable, revegetated condition with functioning drainage, however, a few have drainage and erosion problems. In general terms these roads cost very little to maintain. Installation and maintenance of

closure devices such as gates, berms, and boulders is needed on these roads. Condition surveys are done very infrequently. Maintenance needs on ML1 roads are identified when inspections reveal site specific issues. Currently the Forest spends little to no funding on maintenance of ML 1 roads.

Maintenance Level 2 Roads:

ML2 roads are open for use by high clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations. Warning signs and traffic control devices are not provided with the exception that some signing may be posted at intersections. Motorists should have no expectations of being alerted to potential hazards while driving these roads. Maintenance consists of maintaining the road prism for passage of high-clearance vehicles, maintaining drainage facilities, removing/repairing slides and slumps, brushing, cutting fallen trees off the roads, and installing/repairing seasonal closure gates. ML2 roads range from rocky roads that require little maintenance to incised roads in erosive soils that require frequent attention. Some of these roads require armoring of drainage dips to handle the traffic loads and minimize resource impacts. Condition surveys are done only sporadically. Currently, a minimum of 10% of the ML2 roads are maintained Forest-wide on an annual basis. Work typically includes reshaping dips, filling in deep ruts, pulling lead-off ditches, and maintaining culverts. Currently the force account crew spends approximately one full season of equipment and operator time maintaining ML2 roads on an annual basis, which equates to approximately $107,250. In FY2013, 165 miles of ML2 roads were maintained Forest-wide for an annual cost per mile of $650.

Maintenance Level 3 Roads:

ML3 roads are open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Warning signs and traffic control devices are provided to alert motorists of situations that may violate expectations. These roads are typically surfaced with aggregate but can be native surface. A combination of drainage dips and culverts provide drainage. Potholing or washboarding may occur. These roads are subject to the requirements of the Highway Safety Act. Maintenance guidelines include replacing the base course and surfacing as needed, surface blading, cleaning ditches, cleaning/replacing culverts, cleaning/replacing cattleguards, clearing fallen trees off the roads, controlling the vegetation to provide for sight distance, repairing/removing slides and slumps, installing/maintaining regulatory signs per the Manual on Uniform Traffic Control Devices (MUTCD), and installing/repairing seasonal closure gates.

Surface blading and ditches: Currently the force account crew blades these roads a minimum of once per year. Higher traffic roads require blading more than once per year. Cooperative agreements with the counties (Schedule A) help to keep running surfaces smooth. Severe washboarding and potholing can create a safety hazard causing drivers to lose control of their vehicles. The aggregate surface on some of the roads has deteriorated to a point that they are no longer bladeable. Gravel that should be replaced every ten years has now gone beyond the 20 year mark. Site specific surveys indicate that although the road surface is deteriorating, resource impacts are generally not occurring. Ditches are generally pulled when the drainage is no longer functioning.

Culverts, cattleguards and gates: All the ML3 roads are evaluated on an annual basis by the force account crew. Plugged culvert inlets, full catch basins, full cattleguards, and bent or broken gates are cleaned or repaired. Slumps, slides, and boulders in the road are removed and culverts are replaced when necessary.

Signing: The sign crew is responsible for installing, replacing, and straightening regulatory, warning, and guide signs on the Forest. The new MUTCD guidelines require that the retro-reflectivity requirements are met on these signs by 2015.

All of the above costs equate to approximately $365,700 on an annual basis. In FY2013, 318 miles of ML3 roads were maintained Forest-wide for an annual cost per mile of $1150.

Maintenance Level 4 Roads:

ML4 roads are open roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane with turnouts. Some roads may be paved and/or dust abated. MUTCD is applicable. These roads are subject to the requirements of the Highway Safety Act. All of the above costs equate to approximately $636,000 on an annual basis. In FY2013, 318 miles of ML4 roads were maintained Forest-wide for an annual cost per mile of $2000.

Maintenance Level 5 Roads:

ML5 roads are open roads that provide a high degree of user comfort and convenience. These roads are normally double lane with paved surfaces. However, some may be aggregate surfaced and dust abated. MUTCD is applicable. Annual patching costs approximately $25,000 Forest-wide. Roads should be generally chip sealed or receive other surface treatment every ten years for $100,000 per mile ($27,000 per year). In FY2013, 0 miles of ML5 roads were maintained.

Road Deferred Maintenance

Beginning in 1999, the Forest conducted road condition surveys to determine the actual cost of maintaining the road system to standard. Work items were also recorded to determine the cost of road maintenance deferred in previous years due to lack of funding. Finally, road improvement work necessary to bring the roads up to the desired maintenance level was identified and documented in INFRA. The INFRA database is used by the Forest as a bookkeeping tool to document and track deferred maintenance needs on National Forest System Roads. An example illustrated here is aggregate replacement on a ML3 road: a four inch depth aggregate lift costs between $40,000 and $100,000 per mile, and for tracking purposes is assumed to be required every 10 years. In practice, a particular road may need aggregate replacement more or less often, and a suitable aggregate surface may often be adequately maintained by spot surfacing and by application of dust abatement which extends surfacing life and protects the investment while providing for safe access and resource protection. Detailed surveys and investigation are required on aggregate surfaced roads in optimizing aggregate replacement and investment; utilizing appropriate surface maintenance procedures is also key to maximizing surfacing life and ensuring maximum return on the surfacing dollar. Thus, deferred maintenance numbers in INFRA may not be indicative of the actual funding needed for adequate road maintenance.

Deferred maintenance costs were determined from the INFRA database as of May 2011. Average District-wide $/mile were determined using only those roads for which costs had been entered into INFRA. There are many miles of ML1 and ML2 roads for which cost information is not available in INFRA.

Road Maintenance Costs

Annual and deferred maintenance costs for the existing road system are displayed in the tables below. These are average costs. The costs vary widely from road to road based on site specific conditions. The "Annual $/mile" was calculated by dividing the $/mile by the maintenance interval. The "Total $" columns for both annual and deferred maintenance were calculated by multiplying total miles by the Annual $/mile. Currently, it is anticipated that the engineers' estimated actual costs provide a low estimate and that the INFRA costs provide a high estimate. The actual maintenance costs are likely between the two numbers.

Table 1: Annual Maintenance Costs for Existing Road System

Maintenance Level	Total Miles (Laramie Peak Unit Douglas Ranger District)	Engineers' $/mile (Forest-wide average)	INFRA $/mile (Forest-wide average)	Maintenance Interval	Engineers' Annual $/mile*	INFRA Annual $/mile*	Engineers' Total $	INFRA Total $
1	89	-		20 years	-	$187	-	$16,643
2	101	$650	$2,898	5 years	$130	$580	$13,130	$58,580
3	32	$1,150	$5,610	Annually	$1,150	$5,610	$36,800	$179,520
4	0	$2,000	$12,000	Annually	$2,000	$12,000	-	-
5	0	$4,000	$45,000	See below	$4,000	$45,000	-	-
Total	222						$49,930	$254,743

*Calculated for a 5 year interval on Level 2 roads and a 20 year interval on Level 1 roads. Costs for Level 5 roads include patching annually and chip sealing or other surface treatment every 10 years.

Table 2: Deferred Maintenance Costs

Maintenance Level	Existing Road System		
	Total Miles (Laramie Peak Unit, Douglas Ranger District)	INFRA $/mile (Forest-wide average)	Total $
1	89	$187	$16,643
2	101	$3,207	$323,907
3	32	$9,610	$307,520
4	0	$22,259	-
5	0	$99,822	-
Total	222		$648,070

The appropriated funding is adequate to perform annual maintenance on some, but not all, roads on the Laramie Peak Unit. The deferred maintenance costs are considerably higher than the appropriated funding. As a result, most of the deferred maintenance needs are not currently being addressed. This Travel Analysis will inform subsequent site specific NEPA analyses that may carry forward for implementation, reject, or change the recommendations in this report. These NEPA analyses, in combination with strategic prioritization of anticipated allocated funding, will determine how this report is implemented or modified. As additional information is gathered in the future, this information may result in future modifications to the recommendations in this Travel Analysis.

Other Road Maintenance Funding Sources

Commercial undertakings such as timber sales, oil and gas wells, hauling from private lands, etc. have been charged a percentage of road maintenance costs or have conducted road maintenance actions as part of the project. Road maintenance is provided through these activities for the locations and timeframes when the commercial activity takes place.

A limited amount of road maintenance or decommissioning has occurred during and after oil and gas activities and after timber sales are complete through the collection of Knudsen-Vandenberg (KV) funds for sale area improvement.

Recently American Recovery and Reinvestment Act (ARRA) funding had been utilized for surface replacement on paved roads, surface rock replacement on graveled roads, gate purchases and installation, and road decommissioning. In addition, Forest Service Legacy Funding has also been secured for these activities including aquatic organism passage and drainage improvements projects.

Trail Maintenance

The MBRTB "CMTL" fund allocation for management of both motorized and non-motorized is shown below (rounded to the nearest thousand dollars). Funding is distributed among the 6 Districts and Supervisor's Office according to allocation criteria based largely on total trail miles. The Laramie Peak Unit of the district has historically received approximately 2% of the Forest allocation.

Table B4: CMTL fund allocations for trail management in recent fiscal years.

FY2011	FY2012	FY2013	FY2014	FY2015
$146,000	$304,000	$736,000	$582,000	$577,000

Taken strictly on a percentage of the total trail miles, the 49 miles of motorized trails within the Laramie Peak Unit of the Douglas Ranger District would receive approximately 2% of the Forest allocation, or $2,920 in FY 2011, $6,080 in FY 2012, $14,700 in FY 2013, $11,640 in FY2014 and $11,540 in FY2015.

As the annual cost to maintain the entire District trail system to standard is higher than the amount appropriated and allocated to the District, annual trail maintenance targets have historically been reduced to reflect inadequate funding. Of the District's 199 miles of summer and winter trails, in FY 2013 47 miles were maintained and 43 miles (22%) met standard. The District has been able to increase its annual trail maintenance targets with increased budgets. Priorities for trail maintenance are set on the local level, with no predetermined method for dividing resources between motorized and non-motorized trails, and summer and winter trails. With roughly 22% of trails being maintained to standard each year, the majority of system trails receive maintenance at least once every five years, with the most popular and heavily used trails receiving maintenance annually.

Motorized trails, especially trails open to vehicles less than 50" in width, generally require more intensive maintenance to meet standard, and hence the greater percentage of annual maintenance. Efforts are made annually to address deferred maintenance items, both system-wide and through intensive reconstruction projects. Limitations in funding continue to hamper these efforts, especially relating to the larger reconstruction needs. The State of Wyoming Trails program helps to maintain motorized trails. The District will continue to utilize this beneficial program to address deferred maintenance needs, as well as other sources of funding and labor not directly tied to standard appropriations, such as Forest Service Legacy Road and Trail funds.

APPENDIX C: RISK/BENEFIT ANALYSIS RATIONALE

RISKS

Condition/Maintenance and Repair Costs

Road and motorized trails were rated based on their existing condition. Routes in good condition were considered to meet standards. Although all require routine maintenance, routes in poor condition usually have significant deferred maintenance and require major repair. Routes in poor condition often cause soil and watershed impacts as discussed below.

Aquatic Organism Passage

Traditionally culverts and other road-stream crossings were designed and constructed to pass the most amount of water for the least amount of money, often without consideration of the structure's ability to allow aquatic organism passage (AOP). Road crossings can act as barriers to nearby aquatic and terrestrial species usually resulting in habitat fragmentation and reduced population connectivity. Eventually the aquatic and terrestrial organism populations may decline as access to important microhabitat types (spawning areas or cover) becomes increasingly difficult or impossible. There is a need to restore stream connectivity at road-stream crossing that act as biotic barriers.

Water Resources

Roads and motorized trails affect water resources primarily by moving sediment from the route surface into streams or wetlands. Routes with poor drainage can develop mud holes, which deepen and churn up sediment every time vehicles pass. Poor location exacerbates watershed impacts. For example, a route that is adjacent to and parallels a stream is more likely to direct sediment into the water than a route further away.

Drainage structures need to be inspected and maintained on a regular basis to remain functional. Inadequate maintenance can result in increased sediment to streams or wetlands, especially if structures, such as culverts, become plugged and fail. Open roads and trails are generally devoid of vegetation and have compacted surfaces causing greater runoff; closed roads are usually vegetated and thus, provide sediment filtering.

The Watershed Condition Framework (WCF) was used to the maximum extent possible to estimate the watershed risk ratings. The WCF "Road and Trail Condition Rating Rule Set," specifically the overall "Road and Trail Condition Indicator" and the "Open Road Density" and a modification of the "Proximity to Water," attributes were used to develop rating criteria. Site-specific road information and professional judgment were used to adjust the rating when appropriate.

Soil/Geologic Hazards

Roads and motorized trails affect soils primarily by causing erosion and loss. Erosion increases in areas with less stable soils and steep slopes. Poor route location, inadequate drainage structures, and inadequate maintenance exacerbate soil impacts. Roads and motorized trails can affect the likelihood of landslides, slumps, mudflows, or rock falls (to say nothing of the budget to repair them!)

Wildlife

Wildlife ratings focused on risks to habitat rather than risks to species, as many species use the diversity of habitats across the District, and species response to motorized travel varies tremendously. A risk rating that emphasized disturbance impacts to species would not suffice for all species, and a risk rating that considers risks to both habitat and species would be difficult as routes cross multiple habitats used by multiple species.

The effect of roads and motorized trails on suitable wildlife habitat depends on factors such as the location of the route, road and/or motorized trail densities, and amount and type of use occurring. All forest management

activities can, negatively or positively, affect wildlife habitat depending on whether it is a key habitat (riparian and wetlands), and how the habitat is used (foraging, breeding, security, escape, etc.)

Based on the above rationale, wildlife risks were determined by the road and motorized trail density within a square mile of each route. Risks were categorized only for National Forest roads or motorized trails. However, state highways, county roads, and BLM roads that adjoin the Forest were included in the calculation of road density.

Invasive Species

Motor vehicle use has great potential to, and often, spreads invasive species by dispersing the seed source. Risk ratings were tied to both the size and distribution of existing noxious weed populations, as well as the potential for spread. Only invasive species on the Wyoming Noxious Weed List were considered.

Cultural Resources

Roads and motorized trails have the potential to affect historic properties. Impacts are most often within the route surface itself, as cultural sites are exposed and damaged through construction, maintenance, and use. Historic sites outside of the route itself, such as rock art, structures, and artifacts, are most often affected by the convenient access. Most roads and trails in use since before the 1966 National Historic Preservation Act, were built without consideration of these effects. In addition, many routes have not been formally inventoried for the presence of cultural resources or National Register of Historic Places evaluation standards. There are likely still unknown or undocumented sites that are, or could be, impacted by road use and maintenance.

The process used to assign risk ratings for the current analysis involved consulting GIS map layers and other available information to determine if a road or area had been inventoried according to current professional standards. Only roads and trails built less than 15 years ago are generally considered adequately surveyed.

The GIS model used to identify probability for effecting resources is only valid for consideration of *pre*historic sites. It is based on topographic characteristics including slope, distance to water lakes and streams, and vegetation. If the model resulted in multiple predictive levels along the length of the route, the most frequently occurring level was chosen. Unfortunately, the MBRTB has not developed a digital model to predict presence of historic resources. This includes historic roads and trails not previously identified and recorded as historic cultural resources. The MBRTB has also never conducted Traditional Cultural Property surveys or assessments so there is no ability to determine the effect of roads/trails on this property type.

Social Conflict (motorized trails only)

The use of motor vehicles on trails is viewed by some non-motorized users as disruptive to their recreational pursuits and experiences. Providing recreation opportunities that minimize these types of user group conflicts is a challenge. Non/motorized use levels and social conflict assessments were based on the combined professional judgment and field experience of District specialists, as there was little quantitative use data available.

BENEFITS

Motorized Recreation Use

To evaluate the general level of benefit provided by each road or motorized trail, each route was rated according to its present level of use. As above, use levels were based on the combined professional judgment and field experience of the District specialists, due to lack of quantitative data on actual road and motorized trail usage.

Recreation Access/Connectivity

Roads and motorized trails are often used to access other recreational activities, such as hiking, camping, hunting, firewood gathering, rock collecting, etc. To evaluate this type of benefit, roads and motorized trails were assigned ratings based on the number of connections to other motorized routes.

Forest Management Access- Timber

The Medicine Bow Forest land base is divided into land Management Areas (MAs). Each MA has a certain emphasis to direct management activities. MAs include specific direction, standards, and guidelines. All roads

were rated based on the emphasis for the given MA in which they were located. Timber harvest on the Douglas Ranger District is not focused wood fiber production, but is done for other needs (wildlife habitat, recreation and wildfire mitigation).

- Major arteries, providing access through known timber areas (MAs 3.5, 4.3, 5.12 and 5.41) were designated moderate benefit. Roads through non-timber emphasis areas that do not preclude treatment were designated low. These areas were represented spatially to ensure there was good access to all portions with lesser road density than primary timber areas.
- Roads that are close to other major roads, <0.25 miles in length, or that provide no additional access or contribute to timber management were rated low (1). Roads where timber harvest is specifically precluded or that access administrative sites were also considered to have minimal benefit for this category.

Forest Management Access- Range

Many motorized routes are used by district personnel and range permittees to manage grazing allotments. Ratings were based on whether roads and trails assist in the movement of livestock or help ranchers maintain fences and water developments.

Forest Management Access- Easements and Authorizations

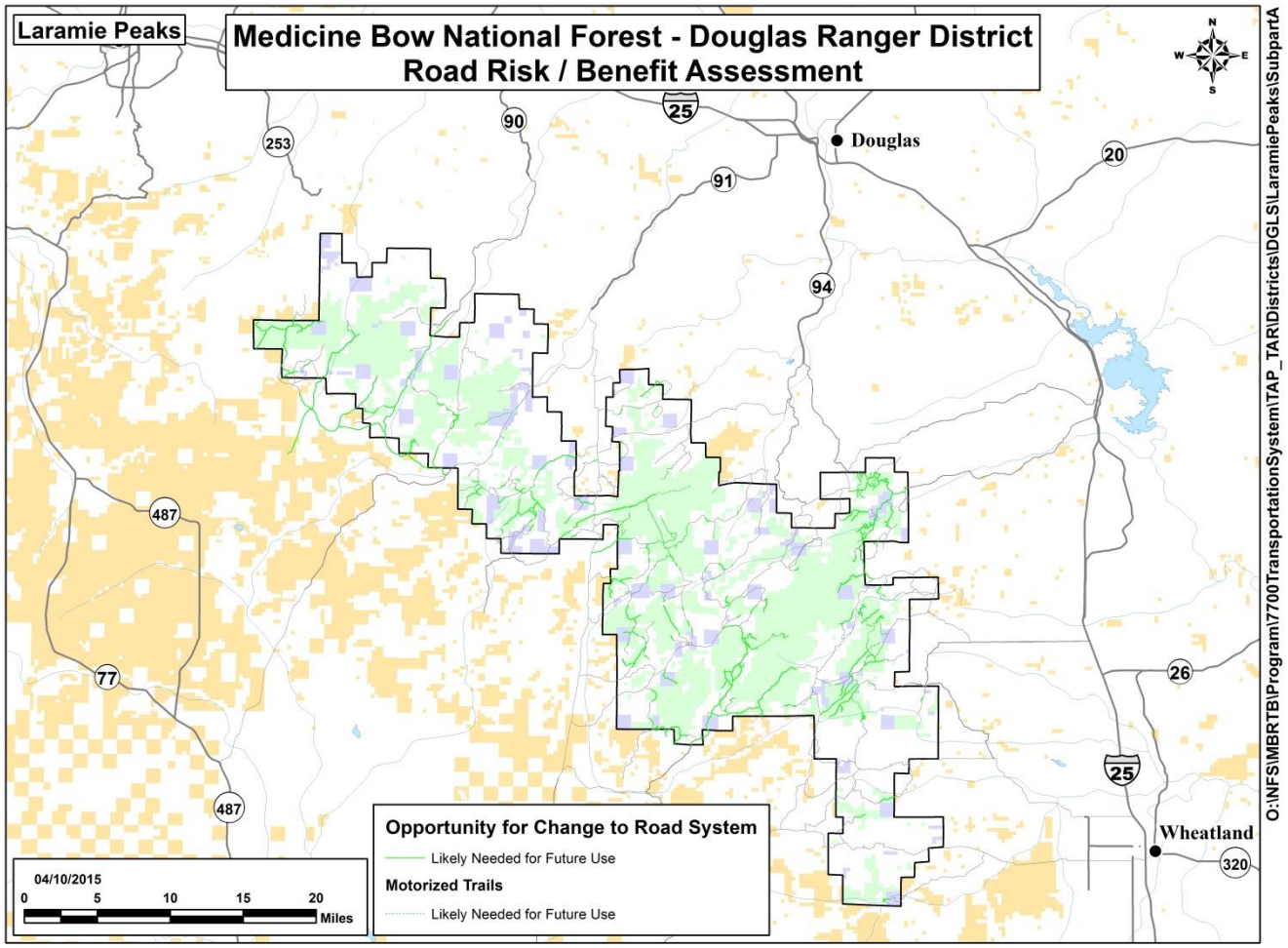
Specific motorized routes are used by private land owners and authorized permittees to access inholdings and facilities. Ratings were based on whether roads and trails were specified in legal access authorizations including rights of way, easements or special use authorizations.

Emergency Access

Roads and motorized trails were rated as to their benefit for emergency access to/from communities, inholdings, campgrounds, administrative sites, etc. In a very few situations, a road was given a moderate rating where it provided entry to a large area which was otherwise void of motorized access.

Past and expected future emergency access use levels were based on the combined professional judgment and field experience of the District specialists, as there was little quantitative data available.

APPENDIX D: RECOMMENDED MINIMUM ROAD SYSTEM MAP



APPENDIX E: ROADS MATRIX RECOMMENDATIONS

See “LAR PK TAP FINAL ROADS MATRIX.pdf”.

APPENDIX F: TRAILS MATRIX RECOMMENDATIONS

See “LAR PK TAP FINAL TRAILS MATRIX.pdf”.